

LP150E06
Liquid Crystal Display

Product Specification

**SPECIFICATION
FOR
APPROVAL**

() Preliminary Specification

(◆) Final Specification

Title	15.0" SXGA+ TFT LCD
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BUYER	HP
MODEL	

SUPPLIER	LG Display Co., Ltd.
*MODEL	LP150E06
Suffix	A3K4

*When you obtain standard approval,
please use the above model name without suffix

SIGNATURE	DATE
/	
/	
/	

Please return 1 copy for your confirmation with your signature and comments.

APPROVED BY	Signature
K. J. Kwon / G.Manager	
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PREPARED BY	
K. T. Moon / Engineer	

Product Engineering Dept.
LG Display Co., Ltd

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RECORD OF REVISIONS

[illegible]

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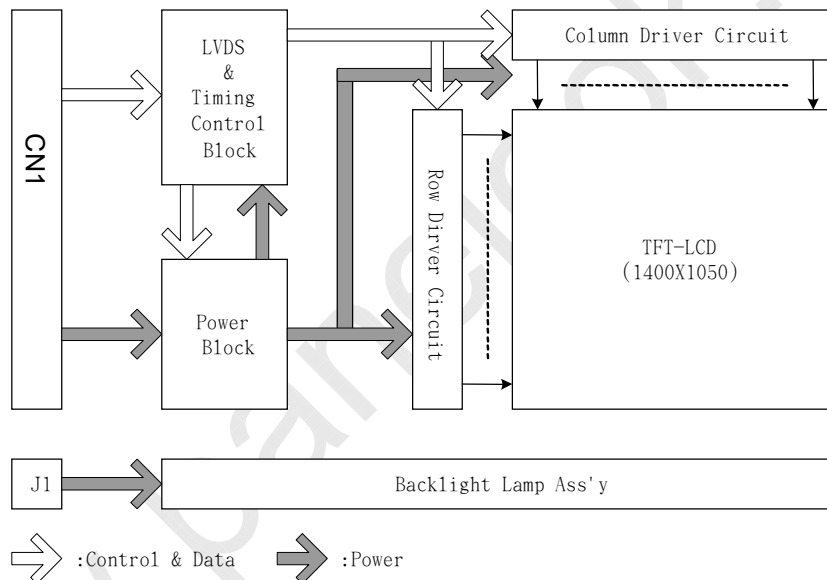
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1. General Description

The LP150E06 is a Color Active Matrix Liquid Crystal Display with an integral Cold Cathode Fluorescent Lamp(CCFL) backlight system. The matrix employs a-Si Thin Film Transistor as the active element. It is a transmissive type display operating in the normally white mode. This TFT-LCD has 15.0 inches diagonally measured active display area with SXGA+ resolution(1050 vertical by 1400 horizontal pixel array) Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes. Gray scale or the brightness of the sub-pixel color is determined with a 6-bit gray scale signal for each dot, thus, presenting a palette of more than 262,144 colors.

The LP150E06 has been designed to apply the interface method that enables low power, high speed, low EMI.

The LP150E06 is intended to support applications where thin thickness, low power are critical factors and graphic display are important. In combination with the vertical arrangement of the sub-pixels, the LP150E06 characteristics provide an excellent flat display for office automation products such as Notebook PC.



General Features

Active Screen Size	15.0 inches(38.1cm) diagonal
Outline Dimension	317.2(H) x 241.4(V), 5.7(D) mm(Typ.)
Pixel Pitch	0.2175 mm x 0.2175 mm
Pixel Format	1400 horiz. By 1050 vert. Pixels RGB strip arrangement
Color Depth	6-bit, 262,144 colors
Luminance, White	185 cd/m ² (Typ.), 5p average
Power Consumption	Total 4.8 W (Typ.) (1.3W Logic / 3.5W Backlight)
Weight	520g(Typ.), 535g(Max.)
Display Operating Mode	Transmissive mode, normally white
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer

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2. Absolute Maximum Ratings

The following are maximum values which, if exceeded, may cause faulty operation or damage to the unit.

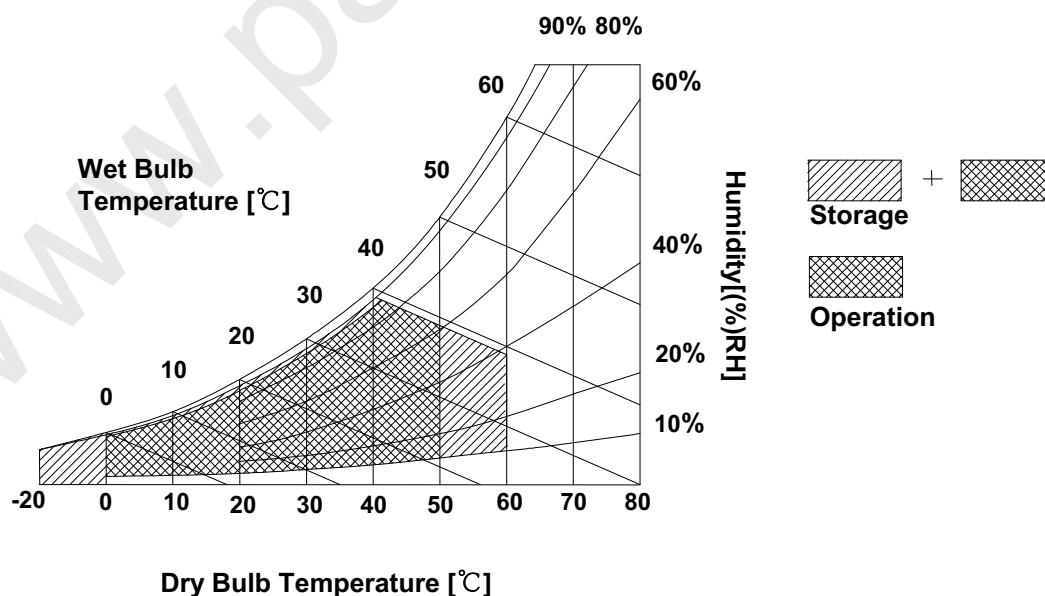
Table 1. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Values		Units	Notes
		Min	Max		
Power Input Voltage-ON	VCC	2.7	4.0	Vdc	at 25 ± 5°C
Power Input Voltage-OFF	GND	-0.3	0.3	Vdc	at 25 ± 5°C
Operating Temperature	T _{OP}	0	50	°C	1
Storage Temperature	T _{ST}	-20	60	°C	1
Operating Ambient Humidity	H _{OP}	10	90	%RH	1
Storage Humidity	H _{ST}	10	90	%RH	1
Electrostatic Durability (ESD)	V _{ESD}	± 8.0		kV	2

Note : 1. Temperature and relative humidity range are shown in the figure below.

Wet bulb temperature should be 39°C Max, and no condensation of water.

2. Condition 1) Non-operation, 150pF-330Ω, 25°C, 40~60%RH
 2) I/F Connector pins are subjected.
 3) The surface of Metal bezel and LCD are subjected except interface connector.(LCD side)
 4) Discharge interval time 1sec, 10 times each place





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3. Electrical Specifications

3-1. Electrical Characteristics

The LP150E06 requires two power inputs. One is employed to power the LCD electronics and to drive the TFT array and liquid crystal. The second input which powers the CCFL, is typically generated by an inverter. The inverter is an external unit to the LCD.

Table 2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
MODULE :						
Power Supply Input Voltage	VCC	3.0	3.3	3.6	Vdc	
Power Supply Input Current	I _{CC}	-	385	443	mA	1
Power Consumption	Pc	-	1.30	1.60	Watt	1
Differential Impedance	Zm	90	100	110	ohm	2
LAMP :						
Operating Voltage	V _{BL}	630	665	860	V _{RMS}	3
Operating Current	I _{BL}	2.0	5.0	6.8	mA _{RMS}	
Established Starting Voltage	Vs					4
at 25 °C		-	-	1165	V _{RMS}	
at 0 °C		-	-	1400	V _{RMS}	
Operating Frequency	f _{BL}	50	65	80	kHz	5
Discharge Stabilization Time	Ts	-	-	3	Min	6
Power Consumption	P _{BL}	-	3.5	4.4	Watt	7
Life Time		10,000	-	-	Hrs	8

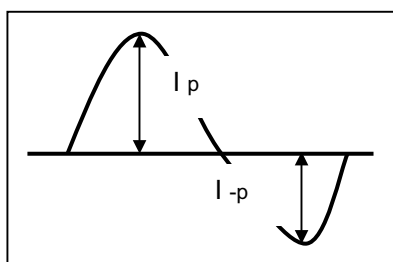
Note : The design of the inverter must have specifications for the lamp in LCD Assembly.

The performance of the Lamp in LCM, for example life time or brightness, is extremely influenced by the characteristics of the DC-AC inverter. So all the parameters of an inverter should be carefully designed so as not to produce too much leakage current from high-voltage output of the inverter. When you design or order the inverter, please make sure unwanted lighting caused by the mismatch of the lamp and the inverter(no lighting, flicker, etc) never occurs. When you confirm it, the LCD – Assembly should be operated in the same condition as installed in you instrument.

1. The specified current and power consumption are under the VCC=3.3V, 25°C, f_v=60Hz condition whereas Mosaic pattern is displayed and f_v is the frame frequency.
2. This impedance value is needed to proper display and measured from LVDS T_x to the mating connector.
3. The variance of the voltage is ± 10%.
4. FOS, and reliability test condition is at 6.0mA
5. The voltage above V_s should be applied to the lamps for more than 1 second for start-up. Otherwise, the lamps may not be turned on. The used lamp current is the lamp typical current.

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6. The output of the inverter must have symmetrical(negative and positive) voltage waveform and symmetrical current waveform.(Unsymmetrical ratio is less than 10%) Please do not use the inverter which has unsymmetrical voltage and unsymmetrical current and spike wave.
Lamp frequency may produce interface with horizontal synchronous frequency and as a result this may cause beat on the display. Therefore lamp frequency shall be as away possible from the horizontal synchronous frequency and from its harmonics in order to prevent interference.
 7. Let's define the brightness of the lamp after being lighted for 5 minutes as 100%.
 T_s is the time required for the brightness of the center of the lamp to be not less than 95%.
 8. The lamp power consumption shown above does not include loss of external inverter.
The used lamp current is the lamp typical current.
 9. The life is determined as the time at which brightness of the lamp is 50% compared to that of initial value at the maximum lamp current($6.0\text{mA}_{\text{RMS}}$) on condition of continuous operating at $25 \pm 2^\circ\text{C}$
 10. Requirements for a system inverter design, which is intended to have a better display performance, a better power efficiency and a more reliable lamp, are following.
It shall help increase the lamp lifetime and reduce leakage current.
 - a. The asymmetry rate of the inverter waveform should be less than 10%.
 - b. The distortion rate of the waveform should be within $\sqrt{2} \pm 10\%$.
- * Inverter output waveform had better be more similar to ideal sine wave.



* Asymmetry rate:

$$|I_p - I_{-p}| / I_{\text{rms}} * 100\%$$

* Distortion rate

$$I_p \text{ (or } I_{-p}) / I_{\text{rms}}$$

❖ Do not attach a conducting tape to lamp connecting wire.

If the lamp wire attach to a conducting tape, TFT-LCD Module has a low luminance and the inverter has abnormal action. Because leakage current is occurred between lamp wire and conducting tape.



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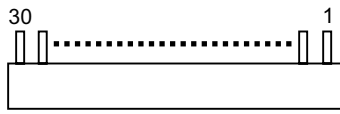
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3-2. Interface Connections

The interface connections are compatible with ISP (Industry Standard Panels) 15.0" Mounting and Top Level Interface Requirements (Version2, June,2000) defined by SPWG (Standard Panels Working Group). This LCD employs two interface connections, a 30 pin connector is used for the module electronics and the other connector is used for the integral backlight system.

The electronics interface connector is a model GT101-30S-HR11 manufactured by LG Cable. The pin configuration for the connector is shown in the table below.

Table 3. MODULE CONNECTOR PIN CONFIGURATION (CN1)

Pin	Symbol	Description	Notes
1	VSS	Ground	[LVDS Transmitter] Thine, THC63LVDF823A or equivalent
2	VCC	Power Supply, 3.3V Typ.	
3	VCC	Power Supply, 3.3V Typ.	
4	VEDID	DDC 3.3V power	[LVDS Receiver] Thine, THC63LVDF824A
5	NC	No Connection	
6	ClkEDID	DDC Clock	
7	DATAEDID	DDC Data	[Connector] LCD : GT101-30S-HR11, LG Cable * JAE FI-XB30Sx-HFxx or JAE FI-XB30S-HF or equivalent. Matching : JAE FI-X30M or equivalent
8	Odd_R _{IN} 0-	-LVDS differential data (odd pixels R0-R5, G0)	
9	Odd_R _{IN} 0+	+LVDS differential data (odd pixels R0-R5, G0)	
10	VSS	Ground	
11	Odd_R _{IN} 1-	-LVDS differential data (odd pixels G1-G5, B0-B1)	
12	Odd_R _{IN} 1+	+LVDS differential data (odd pixels G1-G5, B0-B1)	
13	VSS	Ground	
14	Odd_R _{IN} 2-	-LVDS differential data (odd pixels B2-B5, HS, VS, DE)	
15	Odd_R _{IN} 2+	+LVDS differential data (odd pixels B2-B5, HS, VS, DE)	
16	VSS	Ground	
17	Odd_Clk _{IN} -	-LVDS differential clock (odd pixels)	[Connector pin arrangement]  LCD rear view
18	Odd_Clk _{IN} +	+LVDS differential clock (odd pixels)	
19	VSS	Ground	
20	Even_R _{IN} 0-	-LVDS differential data (even pixels R0-R5, G0)	
21	Even_R _{IN} 0+	+LVDS differential data (even pixels R0-R5, G0)	
22	VSS	Ground	
23	Even_R _{IN} 1-	-LVDS differential data (even pixels G1-G5, B0-B1)	
24	Even_R _{IN} 1+	+LVDS differential data (even pixels G1-G5, B0-B1)	
25	VSS	Ground	
26	Even_R _{IN} 2-	-LVDS differential data (even pixels B2-B5, HS, VS, DE)	
27	Even_R _{IN} 2+	+LVDS differential data (even pixels B2-B5, HS, VS, DE)	
28	VSS	Ground	
29	Even_Clk _{IN} -	-LVDS differential clock (even pixels)	
30	Even_Clk _{IN} +	+LVDS differential clock (even pixels)	

Note: All GND(ground) pins should be connected together and to GND which should also be connected to the LCD's metal frame. All VCC (power input) pins should be connected together.

The backlight interface connector is a model BHSR-02VS-1, manufactured by JST or Compatible.

The mating connector part number is SM02B-BHSS-1 or equivalent.

Table 4. BACKLIGHT CONNECTOR PIN CONFIGURATION (J1)

Pin	Symbol	Description	Notes
1	HV	Power supply for lamp (High voltage side)	1
2	LV	Power supply for lamp (Low voltage side)	1

Notes : 1. The high voltage side terminal is colored pink and the low voltage side terminal is yellow



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3-3. Signal Timing Specifications

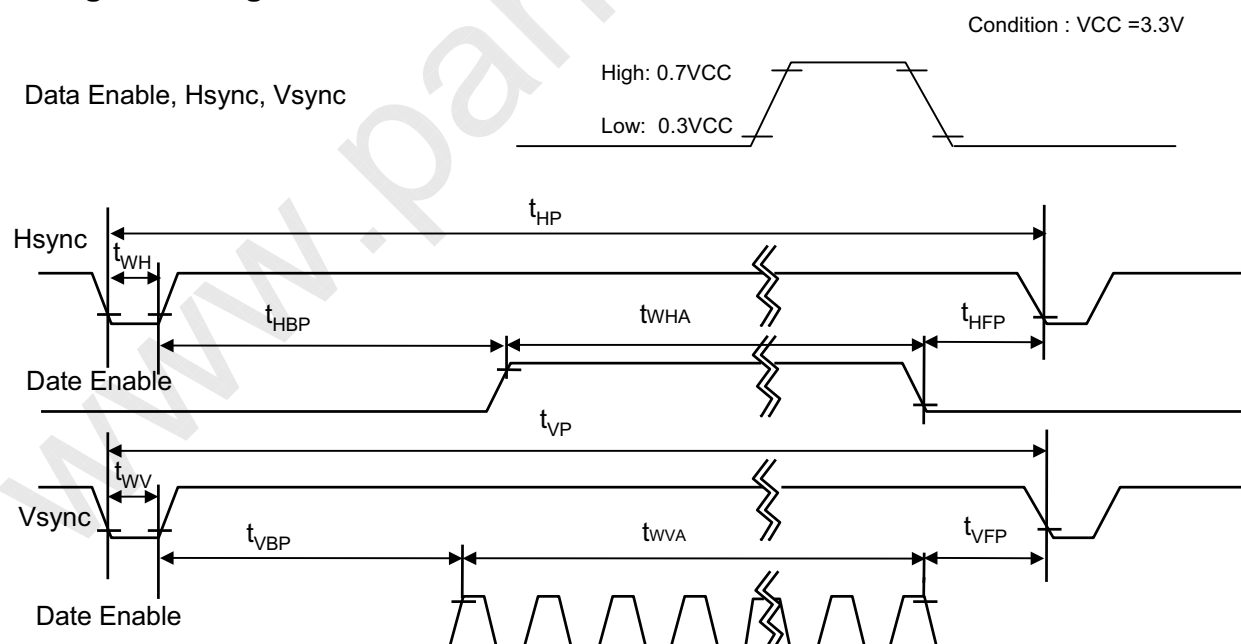
This is the signal timing required at the input of the User connector. All of the interface signal timing should be satisfied with the following specifications and specifications of LVDS Tx/Rx for it's proper operation.

Table 5. TIMING TABLE

ITEM	Symbol		Min	Typ	Max	Unit	Note
DCLK	Frequency	fCLK	53.5	54	54.5	MHz	
Hsync	Period	tHP	732	800	848	tCLK	
	Width	tWH	8	-	-		
Vsync	Period	tVP	1060	1125	1150	tHP	
	Width	tWV	2	-	-		
Data Enable	Horizontal back porch	tHBP	8	-	-	tCLK	
	Horizontal front porch	tHFP	8	-	-		
	Vertical back porch	tVBP	3	-	-	tHP	
	Vertical front porch	tVFP	2	-	-		

DCLK : Dual Port Operating

3-4. Signal Timing Waveforms





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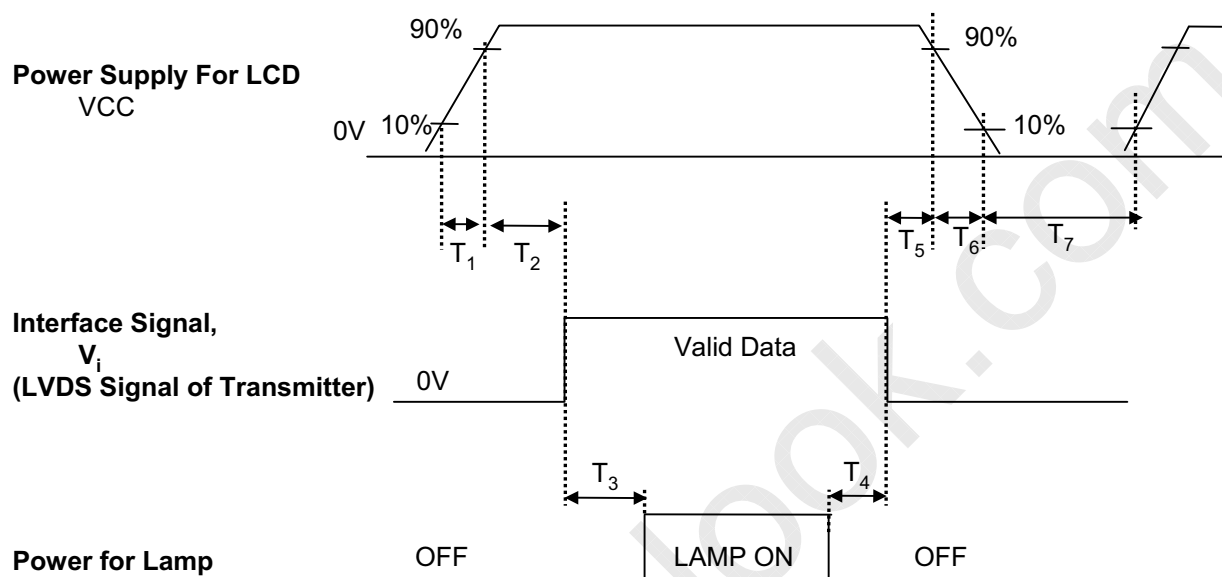
3-5. Color Input Data Reference

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color ; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

Table 6. COLOR DATA REFERENCE

Color		Input Color Data																	
		RED						GREEN						BLUE					
		MSB			LSB			MSB			LSB			MSB			LSB		
		R 5	R 4	R 3	R 2	R 1	R 0	G 5	G 4	G 3	G 2	G 1	G 0	B 5	B 4	B 3	B 2	B 1	B 0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (01)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	...																		
	RED (62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN (01)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	...																		
	GREEN (62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	...																		
	BLUE (62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

3-6. Power Sequence


Table 7. POWER SEQUENCE TABLE

Parameter	Value			Units
	Min.	Typ.	Max.	
T ₁	-	-	10	(ms)
T ₂	0	-	50	(ms)
T ₃	200	-	-	(ms)
T ₄	200	-	-	(ms)
T ₅	0	-	50	(ms)
T ₆	0	-	100	(ms)
T ₇	400	-	-	(ms)

- Notes :
1. Please avoid floating state of interface signal at invalid period.
 2. When the interface signal is invalid, be sure to pull down the power supply for LCD VCC to 0V.
 3. Lamp power must be turn on after power supply for LCD and interface signal are valid.

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4. Optical Specification

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25°C. The values specified are at an approximate distance 50cm from the LCD surface at a viewing angle of Φ and Θ equal to 0°.

FIG. 1 presents additional information concerning the measurement equipment and method.

FIG. 1 Optical Characteristic Measurement Equipment and Method

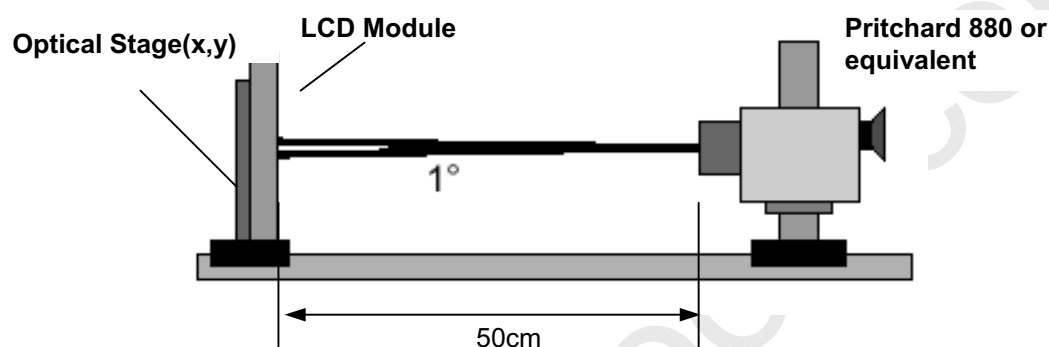


Table 8. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, fv=60Hz
 Dclk= 54MHz, IBL= 6.0mA

Parameter	Symbol	Values			Units	Notes
		Min	Typ	Max		
Contrast Ratio	CR	150	300	-		1
Surface Luminance, white (5P, Ave)	L _{WH}	150	185	-	cd/m ²	2
Luminance Variation	δ_{WHITE}	-	-	1.85		3
Response Time						4
Rise Time	Tr _R	-	10	20	ms	
Decay Time	Tr _D	-	20	30	ms	
Color Coordinates						PR650 or equivalent
RED	RX	0.560	0.590	0.620		
	RY	0.313	0.343	0.373		
GREEN	GX	0.290	0.320	0.350		
	GY	0.510	0.540	0.570		
BLUE	BX	0.125	0.155	0.185		
	BY	0.103	0.133	0.163		
WHITE	WX	0.283	0.313	0.343		
	WY	0.299	0.329	0.359		
Viewing Angle						5
x axis, right($\Phi=0^\circ$)	Θ_r	55	60	-	degree	
x axis, left ($\Phi=180^\circ$)	Θ_l	55	60	-	degree	
y axis, up ($\Phi=90^\circ$)	Θ_u	40	45	-	degree	
y axis, down ($\Phi=270^\circ$)	Θ_d	40	45	-	degree	
Gray Scale						6



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Notes 1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the average of 5 points across the LCD surface 50cm from the surface with all pixels displaying white. For more information see FIG 1., When $I_{BL}=6.0\text{mA}$.

3. The variation in surface luminance , The Panel total variation (δ_{WHITE}) is determined by measuring L_{ON} at each test position 1 through 13, and then dividing the maximum L_{ON} of 13 points luminance by minimum L_{ON} of 13 points luminance. For more information see FIG 2.

$$\delta_{WHITE} = \text{Maximum}(L_1, L_2, \dots L_{13}) / \text{Minimum}(L_1, L_2, \dots L_{13})$$

4. Response time is the time required for the display to transition from white to black(RiseTime, Tr_R) and from black to white(Decay Time, Tr_D). For additional information see FIG 3.

5. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 4.

6. Gray scale specification

* $f_v=60\text{Hz}$

Gray Level	Luminance [%] (Typ)
L0	0.33
L7	0.83
L15	3.93
L23	9.50
L31	19.0
L39	31.0
L47	48.0
L55	75.0
L63	100.0

FIG. 2 Luminance

<measuring point for surface luminance & measuring point for luminance variation>

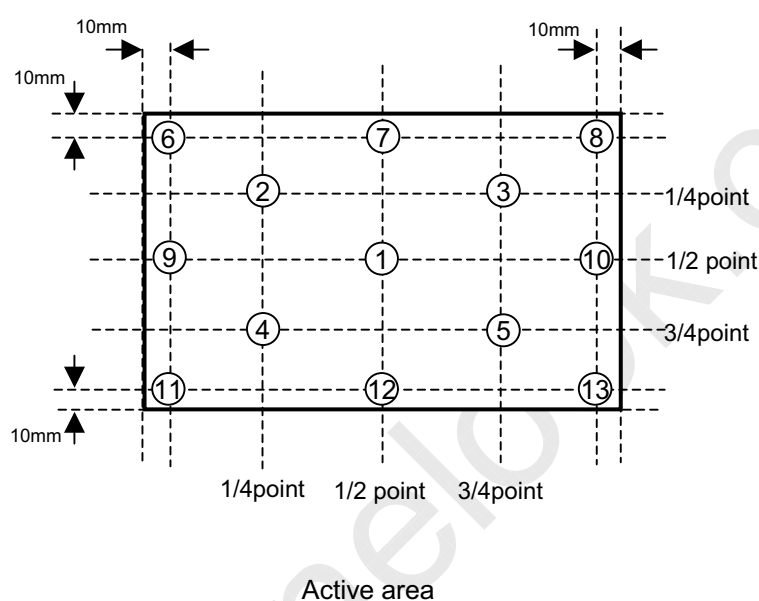


FIG. 3 Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".

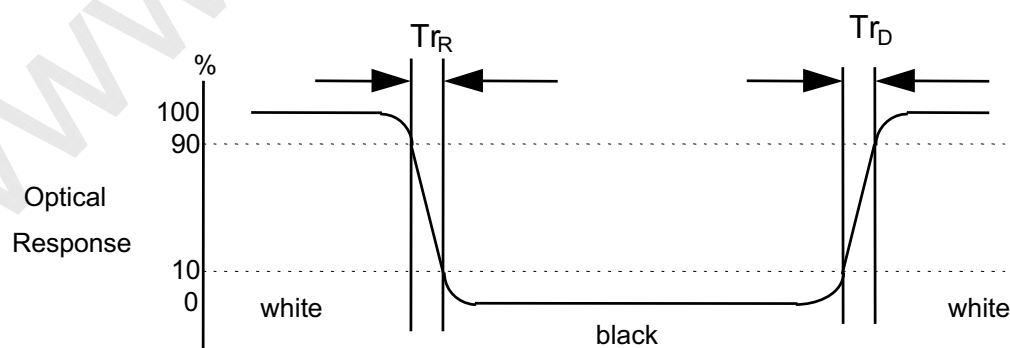
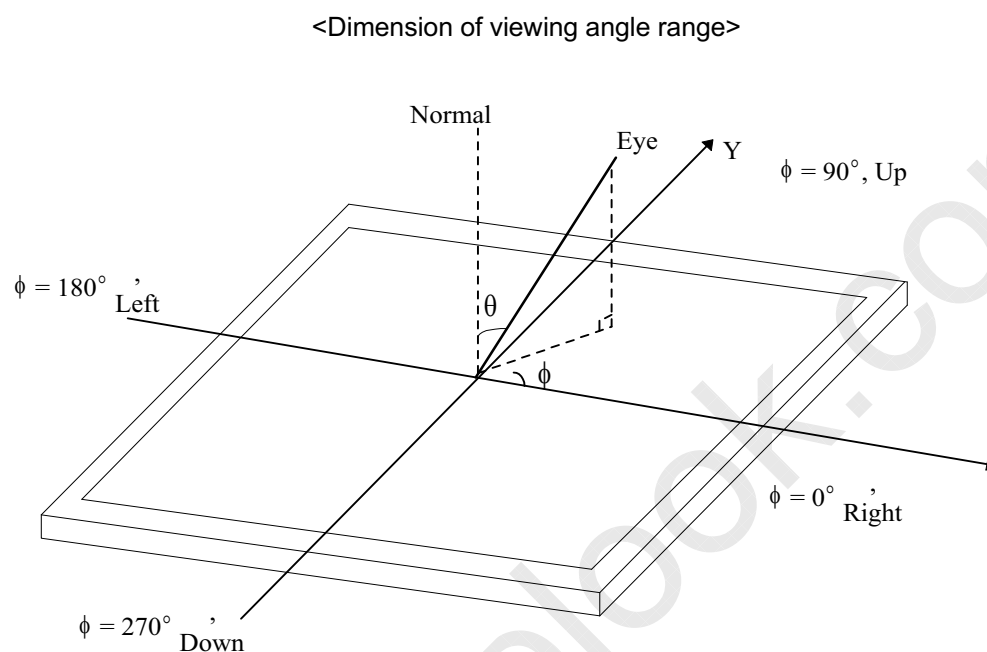


FIG. 4 Viewing angle



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5. Mechanical Characteristics

The contents provide general mechanical characteristics for the model LP150E06. In addition the figures in the next page are detailed mechanical drawing of the LCD.

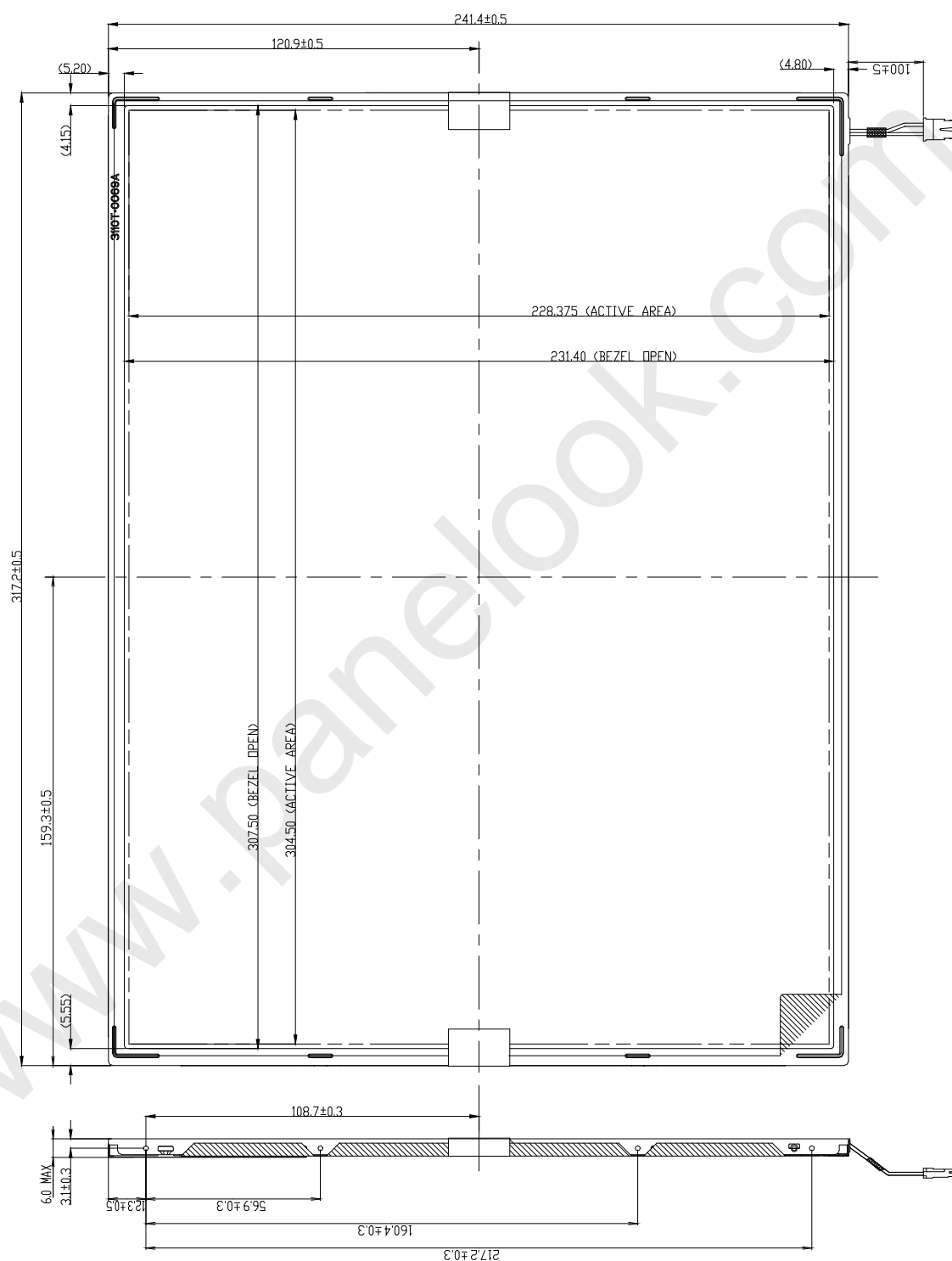
Outline Dimension	Horizontal	317.2 ± 0.5mm
	Vertical	241.4 ± 0.5mm
	Depth	5.7 mm(Typ.) 6.0mm(Max.)
Bezel Area	Horizontal	307.5 ± 0.5mm
	Vertical	231.4 ± 0.5mm
Active Display Area	Horizontal	304.500 mm
	Vertical	228.375 mm
Weight	520g(Typ.), 535g(Max.)	
Surface Treatment	Hard coating(3H) Anti-glare treatment of the front polarizer (Haze 25%)	



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<FRONT VIEW>

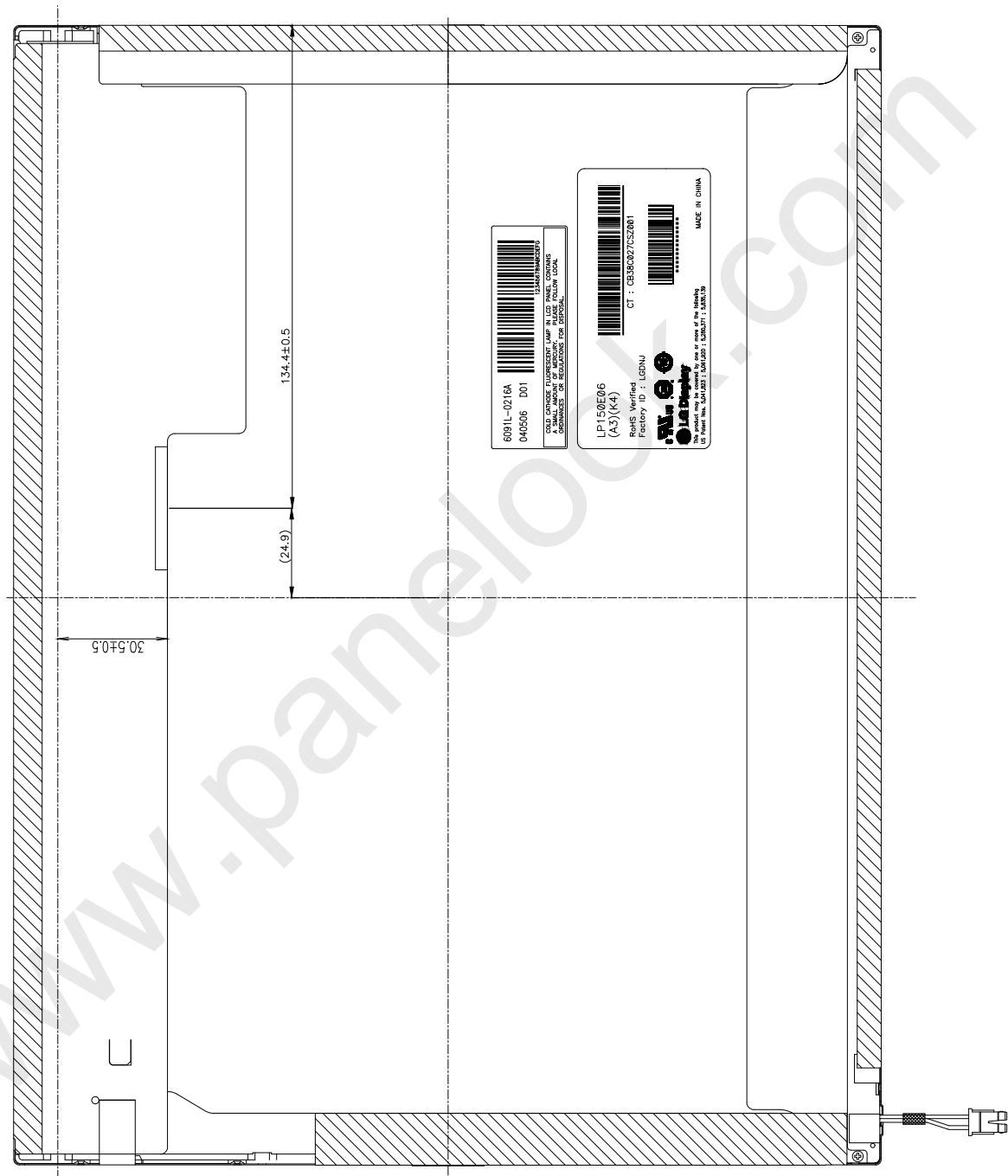


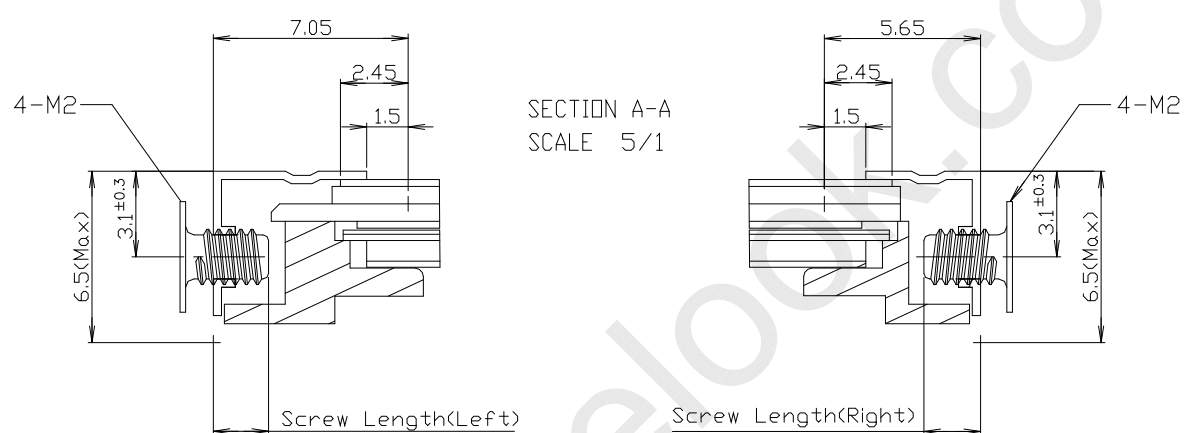


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<REAR VIEW>



Product Specification
[DETAIL DESCRIPTION OF SIDE MOUNTING SCREW]


- * Screw Length : Left and Right (Max : 2.5, Min : 2.0)
- * Screw Torque : Max 2.0kgf cm

Notes : 1. Screw plated through the method of non-electrolytic nickel plating is preferred to reduce possibility that results in vertical and/or horizontal line defect due to the conductive particles from screw surface.

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6. Reliability

Environment test condition

No.	Test Item	Conditions
1	High temperature storage test	Ta= 60°C, 240h
2	Low temperature storage test	Ta= -20°C, 240h
3	High temperature operation test	Ta= 50°C, 50%RH, 240h
4	Low temperature operation test	Ta= 0°C, 240h
5	Vibration test (non-operating)	Sine wave, 10 ~ 500 ~ 10Hz, 1.5G, 0.37oct/min 3 axis, 1hour/axis
6	Shock test (non-operating)	Half sine wave, 180G, 2ms one shock of each six faces(I.e. run 180G 2ms for all six faces)
7	Altitude operating storage / shipment	0 ~ 10,000 feet (3,048m) 24Hr 0 ~ 40,000 feet (12,192m) 24Hr

{ Result Evaluation Criteria }

There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.

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7. International Standards

7-1. Safety

- a) UL 60950, Third Edition, Underwriters Laboratories, Inc., Dated Dec. 11, 2000.
Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment.
- b) CAN/CSA C22.2, No. 60950, Third Edition, Canadian Standards Association, Dec. 1, 2000.
Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment.
- c) EN 60950 : 2000, Third Edition
IEC 60950 : 1999, Third Edition
European Committee for Electro-technical Standardization(CENELEC)
EUROPEAN STANDARD for Safety of Information Technology Equipment Including Electrical Business Equipment.

7-2. EMC

- a) ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electrical Equipment in the Range of 9kHz to 40GHz." American National Standards Institute(ANSI), 1992
- b) C.I.S.P.R "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." International Special Committee on Radio Interference.
- c) EN 55022 "Limits and Methods of Measurement of Radio Interface Characteristics of Information Technology Equipment." European Committee for Electro-technical Standardization.(CENELEC), 1998
(Including A1: 2000)

LP150E06
Liquid Crystal Display

Product Specification

8. Packing

8-1. Designation of Lot Mark

a) Lot Mark

A	B	C	D	E	F	G	H	I	J	K	L	M
---	---	---	---	---	---	---	---	---	---	---	---	---

A,B,C : SIZE(INCH)
E : MONTHD : YEAR
F ~ M : SERIAL NO.

Note

1. YEAR

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mark	1	2	3	4	5	6	7	8	9	0

2. MONTH

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mark	1	2	3	4	5	6	7	8	9	A	B	C

b) Location of Lot Mark

Serial No. is printed on the label. The label is attached to the backside of the LCD module.
This is subject to change without prior notice.

8-2. Packing Form

- a) Package quantity in one box : 30 pcs
- b) Box Size :482mm × 371mm × 325mm

LP150E06
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Product Specification

9. PRECAUTIONS

Please pay attention to the followings when you use this TFT LCD module.

9-1. MOUNTING PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Please attach the surface transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to resist external force.
- (4) You should adopt radiation structure to satisfy the temperature specification.
- (5) Acetic acid type and chlorine type materials for the cover case are not desirable because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- (6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are detrimental to the polarizer.)
- (7) When the surface becomes dusty, please wipe gently with absorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
- (8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (9) Do not open the case because inside circuits do not have sufficient strength.

9-2. OPERATING PRECAUTIONS

- (1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage :
 $V = \pm 200\text{mV}$ (Over and under shoot voltage)
- (2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
- (3) Brightness depends on the temperature. (In lower temperature, it becomes lower.)
And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
- (4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

LP150E06
Liquid Crystal Display

Product Specification

9-3. ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc. And don't touch interface pin directly.

9-4. PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

9-5. STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

- (1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5°C and 35°C at normal humidity.
- (2) The polarizer surface should not come in contact with any other object.
It is recommended that they be stored in the container in which they were shipped.

9-6. HANDLING PRECAUTIONS FOR PROTECTION FILM

- (1) The protection film is attached to the bezel with a small masking tape.
When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the bezel after the protection film is peeled off.
- (3) You can remove the glue easily. When the glue remains on the bezel surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.



LP150E06
Liquid Crystal Display

Product Specification

APPENDIX [A] - Enhanced Extended Display Identification Data (EEDID™)

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)	Value (binary)	
0	00	Header	0 0	00000000	Header
1	01		F F	11111111	
2	02		F F	11111111	
3	03		F F	11111111	
4	04		F F	11111111	
5	05		F F	11111111	
6	06		F F	11111111	
7	07		0 0	00000000	
8	08	EISA manufacturer code = LGP	3 0	00110000	Vender/ Product ID
9	09		F 0	11110000	
10	0A	Product code	5 3	01010011	
11	0B	(Hex, LSB first)	1 1	00010001	
12	0C	D (32-bit) serial number = don't care	0 0	00000000	
13	0D		0 0	00000000	
14	0E		0 0	00000000	
15	0F		0 0	00000000	
16	10	Week of manufacture = don't care	0 0	00000000	EDID Version/ Revision
17	11	Year of manufacture = don't care	0 0	00000000	
18	12	EDID Structure version # = 1	0 1	00000001	Display Parameter
19	13	EDID Revision # = 2	0 2	00000010	
20	14	Video input definition = Digital / p, non TMDS CRGB	8 0	10000000	
21	15	Max H image size (cm) = 30.45cm (30)	1 E	00011110	
22	16	Max V image size (cm) = 22.8375cm (23)	1 7	00010111	Color Characteristic
23	17	Display gamma = 2.2	7 8	01111000	
24	18	Feature support (DPM S) = Active off, RGB Color	0 A	00001010	
25	19	Red/Green low Bits	3 C	00111100	
26	1A	Blue/White Low Bits	8 0	10000000	
27	1B	Red X	9 7	10010111	
28	1C	Red Y	5 7	01010111	
29	1D	Green X	5 1	01010001	
30	1E	Green Y	8 A	10001010	Established Timings
31	1F	Blue X	2 7	00100111	
32	20	Blue Y	2 2	00100010	
33	21	White X	5 0	01010000	
34	22	White Y	5 4	01010100	Standard Timing ID
35	23	Established Timing I	0 0	00000000	
36	24	Established Timing II	0 0	00000000	
37	25	Manufacturer's Timings	0 0	00000000	
38	26	Standard Timing Identification 1 was not used	0 1	00000001	Standard Timing ID
39	27	Standard Timing Identification 1 was not used	0 1	00000001	
40	28	Standard Timing Identification 2 was not used	0 1	00000001	
41	29	Standard Timing Identification 2 was not used	0 1	00000001	
42	2A	Standard Timing Identification 3 was not used	0 1	00000001	
43	2B	Standard Timing Identification 3 was not used	0 1	00000001	
44	2C	Standard Timing Identification 4 was not used	0 1	00000001	
45	2D	Standard Timing Identification 4 was not used	0 1	00000001	
46	2E	Standard Timing Identification 5 was not used	0 1	00000001	
47	2F	Standard Timing Identification 5 was not used	0 1	00000001	
48	30	Standard Timing Identification 6 was not used	0 1	00000001	
49	31	Standard Timing Identification 6 was not used	0 1	00000001	
50	32	Standard Timing Identification 7 was not used	0 1	00000001	
51	33	Standard Timing Identification 7 was not used	0 1	00000001	
52	34	Standard Timing Identification 8 was not used	0 1	00000001	
53	35	Standard Timing Identification 8 was not used	0 1	00000001	

LP150E06
Liquid Crystal Display

Product Specification

Byte# (decimal)	Byte# (HEX)	Field Name and Comments	Value (HEX)	Value (binary)	
54	36	Detailed Timing Descriptor#1	3 0	00110000	Detailed Timing Description #1
55	37	1400 x1050@ 60Hz mode : pixel clock = 108MHz	2 A	00101010	
56	38	Horizontal Active = 1400 pixels	7 8	01111000	
57	39	Horizontal Blanking = 288 pixels	2 0	00100000	
58	3A	Horizontal Active : Horizontal Blanking	5 1	01010001	
59	3B	Vertical Active = 1050 lines	1 A	00011010	
60	3C	Vertical Blanking = 16 lines	1 0	00010000	
61	3D	Vertical Active : Vertical Blanking	4 0	01000000	
62	3E	Horizontal Sync Offset = 32 pixels	2 0	00100000	
63	3F	Horizontal Sync Pulse Width = 112 pixels	7 0	01110000	
64	40	Vertical Sync Offset = 2 lines, Sync Width = 4 lines	2 4	00100100	
65	41	Horizontal Vertical Sync Offset/Width upper 2bits	0 0	00000000	
66	42	Horizontal Image Size = 304.5mm(305)	3 1	00110001	
67	43	Vertical Image Size = 228.375mm(228)	E 4	11100100	
68	44	Horizontal & Vertical Image Size	1 0	00010000	
69	45	Horizontal Border = 0	0 0	00000000	Detailed Timing Description #2
70	46	Vertical Border = 0	0 0	00000000	
71	47	Non-interlaced, Normal display, no stereo, Dual separate sync, H/V pol negatives	1 8	00011000	
72	48	Detailed Timing Descriptor#2	0 0	00000000	
73	49		0 0	00000000	
74	4A		0 0	00000000	
75	4B		0 0	00000000	
76	4C		0 0	00000000	
77	4D		0 0	00000000	
78	4E		0 0	00000000	
79	4F		0 0	00000000	
80	50		0 0	00000000	
81	51		0 0	00000000	
82	52		0 0	00000000	
83	53		0 0	00000000	
84	55		0 0	00000000	Detailed Timing Description #3
85	55		0 0	00000000	
86	56		0 0	00000000	
87	57		0 0	00000000	
88	58		0 0	00000000	
89	59		0 0	00000000	
90	5A	Detailed Timing Descriptor#3	0 0	00000000	
91	5B		0 0	00000000	
92	5C	ASCII Data String Tag (Supplier Name)	0 0	00000000	
93	5D		F E	11111110	
94	5E		0 0	00000000	
95	5F	L	4 C	01001100	
96	60	G	4 7	01000111	
97	61	P	5 0	01010000	
98	62	h	6 8	01101000	
99	63	i	6 9	01101001	Detailed Timing Description #4
100	64	l	6 C	01101100	
101	65	i	6 9	01101001	
102	66	p	7 0	01110000	
103	67	s	7 3	01110011	
104	68	L	4 C	01001100	
105	69	C	4 3	01000011	
106	6A	D	4 4	01000100	
107	6B	LF (Line Feed)	0 A	00001010	
108	6C	Detailed Timing Descriptor#4	0 0	00000000	
109	6D		0 0	00000000	
110	6E	ASCII Data String Tag (Supplier S/N)	0 0	00000000	
111	6F		F E	11111110	
112	70		0 0	00000000	
113	71	L	4 C	01001100	
114	72	P	5 0	01010000	Extension Flag Checksum
115	73	1	3 1	00110001	
116	74	5	3 5	00110101	
117	75	0	3 0	00110000	
118	76	E	4 5	01000101	
119	77	0	3 0	00110000	
120	78	6	3 6	00110110	
121	79	-	2 D	00101101	
122	7A	A	4 1	01000001	
123	7B	3	3 3	00110011	
124	7C	K	4 B	01001011	
125	7D	2	3 2	00110010	
126	7E	Extension flag = 00	0 0	00000000	
127	7F	Checksum	E 8	11101000	

SGS Testing Korea Co., Ltd.

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LG PHILIPS LCD,
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Thirteen samples of LP150 E06
SGS File No. : K-49/2004-0019/1
Remark : Please refer to next page's item name.
Sample Receiving Date : Dec. 08, 2004
Test Performing Date : Dec. 09, 2004
Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.
Test Results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



Jason Han / Director

KHJ/ssp

SGS Testing Korea Co., Ltd.

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Test Report

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LP150E06		
NO.	ITEM NAME	BOM NO.
1	CASE TOP	3110T-0069A
2	COVER SHIELD	3550S-0135A
3	COVER BOTTOM	3550B-0069A
4	PCB CONTROL	6871L-0543C
5	TCP SOURCE	08HYL-0069A
6	TCP GATE	01OKL-0033A
7	GLASS	4890L-0025A
8	DIFFUSER	3022L-0225B
9	PRISM	3032L-0172A
10	LIGHT GUIDE	5150L-0106A
11	SUPPORTER MAIN	4890L-0217A
12	REFLECTOR	3034L-0151A
13	LAMP	6912L-0126C

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Heavy Metal

Test Item	Unit	Test Method	D.L.	Result
				(1)
Cadmium (Cd)	mg/kg	USEPA 3050B, ICP-AES	0.5	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d

Test Item	Unit	Test Method	D.L.	Result
				(2)
Cadmium (Cd)	mg/kg	EN1122, ICP-AES	0.5	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d

Test Item	Unit	Test Method	D.L.	Result		
				(3)	(4)	(5)
Cadmium (Cd)	mg/kg	USEPA 3050B, ICP-AES	0.5	n. d	n. d	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d	650	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d	n. d	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d	n. d	n. d

Test Item	Unit	Test Method	D.L.	Result	
				(6)	(7)
Cadmium (Cd)	mg/kg	USEPA 3050B, ICP-AES	0.5	n. d	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d	13
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d	n. d

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

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Heavy Metal

Test Item	Unit	Test Method	D.L.	Result		
				(8)	(9)	(10)
Cadmium (Cd)	mg/kg	EN1122, ICP-AES	0.5	n. d	n. d	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d	n. d	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d	n. d	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d	n. d	n. d

Test Item	Unit	Test Method	D.L.	Result	
				(11)	(12)
Cadmium (Cd)	mg/kg	EN1122, ICP-AES	0.5	n. d	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	n. d	n. d
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d	n. d

Test Item	Unit	Test Method	D.L.	Result
				(13)
Cadmium (Cd)	mg/kg	USEPA 3050B, ICP-AES	0.5	n. d
Lead (Pb)	mg/kg	USEPA 3050B, ICP-AES	5	n. d
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	0.5	19
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-vis	0.16	n. d

Note (1) n. d. = Not detected
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Flame Retardants

Items	Unit	Test Method	D.L.	Results		
				(2)	(3)	(4)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

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Test Report

No. F690101LF-CTS027570

Date : December 20, 2004

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Flame Retardants

Items	Unit	Test Method	D.L.	Results		
				(5)	(6)	(8)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

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Flame Retardants

Items	Unit	Test Method	D.L.	Results		
				(9)	(10)	(11)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

SGS Testing Korea Co., Ltd.

#18-34, Banbon-dong, Gunpo-city, Kyunggi-do, Korea 435-040
Tel : (031) 428-5765~6, Fax: (031) 427-2374, InterNet>http://www.sgslab.co.kr

Test Report No. F690101LF-CTS027570 Date : December 20, 2004 Page 8 of 8

Flame Retardants

Items	Unit	Test Method	D.L.	Results (12)
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052)239-8908~10, Fax: 052)239-8913, InterNet: <http://www.sgs-lab.co.kr>

Test Report

No. F690101LF-CTS019486

Date : November 4, 2004

Page 1 of 2

LG PHILIPS LCD.
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Lamp Holder

SGS File No. : P-48/2004-1005/4/D

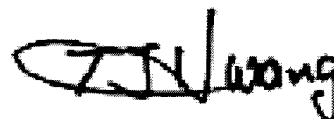
Sample receiving date : Oct. 22, 2004

Test performing date : Oct. 25, 2004

Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.

Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-rd, Onsan-up, Ulsu-gun, Ulsan, Korea 689-890
Tel : 052)239-6008~10, Fax: 052)239-6913, InterNet: http://www.sgslab.co.kr

Test Report No. F690101/LF-CTS019488 Date : November 4, 2004 Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsu-gun, Ulsan, Korea 689-890
Tel : 052)239-6008~10, Fax: 052)239-6013, InterNet-http://www.sgslab.co.kr

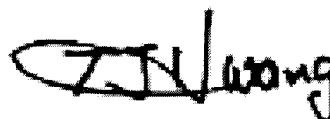
Test Report No. F690101/LF-CTS019485 Date : November 4, 2004 Page 1 of 2

LG PHILIPS LCD,
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Lamp Ring
SGS File No. : P-48/2004-1005/4/C
Sample receiving date : Oct. 22, 2004
Test performing date : Oct. 25, 2004
Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.
Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Oseon-up, Ulsu-gun, Ulsan, Korea 680-890
Tel : 052)239-6008~10, Fax: 052)239-6913, InterNet: <http://www.sgs-lab.co.kr>

Test Report

No. F690101LF-CTS019485

Date : November 4, 2004

Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-rd, Omsan-up, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052)239-8908~10, Fax: 052)239-8913, InterNet: <http://www.sgs-lab.co.kr>

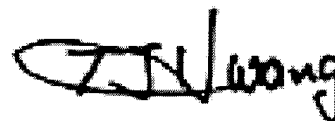
Test Report No. F890101/LF-CTS019489 Date : November 4, 2004 Page 1 of 2

LG PHILIPS LCD.
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Metal Tape
SGS File No. : P-48/2004-1005/4/G
Sample receiving date : Oct. 22, 2004
Test performing date : Oct. 25, 2004
Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.
Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsu-gun, Ulsan, Korea 689-690
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet: http://www.sgslab.co.kr

Test Report No. F690101LF-CTS019489 Date : November 4, 2004 Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

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Test Report No. F690101/LF-CTS019481 Date : November 4, 2004 Page 1 of 2

LG PHILIPS LCD.
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

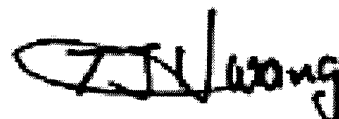
The following merchandise was submitted and identified by the client as : -

Type of Product : Screw
SGS File No. : P-48/2004-1005/4/A
Sample receiving date : Oct. 22, 2004
Test performing date : Oct. 25, 2004

Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.

Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Omsan-up, Ulsu-gun, Ulsan, Korea 689-890
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Test Report

No. F890101LF-CTS019481

Date : November 4, 2004

Page 2 of 2

Heavy Metal

Test Item	Unit	Test Method	Detection Limit	Result
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	53
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	0.18

Note : n. d. = Not detected

***** END *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-Up, Ulsu-gun, Ulsan, Korea 689-890
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet=http://www.sgskorea.co.kr

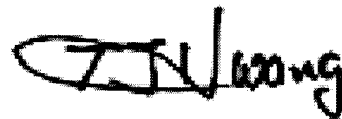
Test Report No. F690101/LF-CTS019490 Date : November 10, 2004 Page 1 of 2

LG PHILIPS LCD.
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as :-

Type of Product : Sheet Fix Tape (Nitto)
SGS File No. : P-48/2004-1005/4/H/a
Sample receiving date : Oct. 22, 2004
Test performing date : Oct. 25, 2004
Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.
Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052/239-8908~10, Fax: 052/239-8913, InterNet: <http://www.sgslab.co.kr>

Test Report No. F690101LF-CTS019490 Date : November 10, 2004 Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nona bromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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#1002-2, Hwasan-rd, Onsan-up, Ulsu-gun, Ulsan, Korea 689-890
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Test Report

No. F690101/LF-CTS019491

Date : November 10, 2004

Page 1 of 2

LG PHILIPS LCD.

642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Sheet Fix Tape (Taesung)

SGS File No. : P-48/2004-1005/4/Hfb

Sample receiving date : Nov. 03, 2004

Test performing date : Nov. 04, 2004

Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.

Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



Thomas Hwang / Lab. Manager

SBP/mss

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Uiju-gun, Ulsan, Korea 689-890
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet: http://www.sgslab.co.kr

Test Report

No. F690101/LF-CTS019491

Date : November 10, 2004

Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsu-gun, Ulsan, Korea 680-820
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet: <http://www.sgslab.co.kr>

Test Report

No. F690101/LF-CTS019488

Date : November 4, 2004

Page 1 of 2

LG PHILIPS LCD.
642-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Tape

SGS File No. : P-48/2004-1005/4/F

Sample receiving date : Oct. 22, 2004

Test performing date : Oct. 25, 2004

Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.

Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd.



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-rd, Onsan-up, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052)239-6008~10, Fax: 052)239-6913, InterNet: http://www.sgs-lab.co.kr

Test Report

No. F690101ALF-CTS019488

Date : November 4, 2004

Page 2 of 2

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results
Cadmium (Cd)	mg/kg	USEPA 3052, ICP-AES	1	n. d.
Lead (Pb)	mg/kg	USEPA 3052, ICP-AES	10	n. d.
Mercury (Hg)	mg/kg	USEPA 3052, ICP-AES	2	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.

Flame Retardants

Items	Unit	Test Method	D.L.	Results
Polybrominated Biphenyls (PBBs)	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromobiphenyl	mg/kg		5	n. d.
Tribromobiphenyl	mg/kg		5	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.
Octabromobiphenyl	mg/kg		5	n. d.
Decabromobiphenyl	mg/kg		5	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

***** End *****

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-r1, Onsan-up, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052)239-8908~10, Fax: 052)239-8913, InterNet: <http://www.sgs-lab.co.kr>

Test Report No. F890101LF-CT5038000 Date : December 10, 2004 Page 1 of 11

LG PHILIPS LCD,
842-3, Jinpyung-dong, Kumi-city,
Kyungbuk, Korea

The following merchandise was submitted and identified by the client as : -

Type of Product : Twenty nine samples of Wire ASSY
(For further details, please see attached.)

SGS File No. : K-48/2004-0003/5

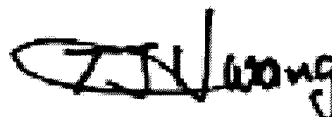
Sample receiving date : Dec. 01, 2004

Test performing date : Dec. 02, 2004

Test Performed : SGS Testing Korea tested the sample which was selected by applicant with following result.

Test results : For further details, please refer to following page.

SGS Testing Korea Co., Ltd



SBP/mss

Thomas Hwang / Lab. Manager

SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Oesan-up, Uiju-gun, Ulsan, Korea 689-890
Tel : 052)239-6008~10, Fax: 052)239-6013, InterNet: <http://www.sgs-lab.co.kr>

Test Report

No. F690101/LF-CTS038000

Date : December 10, 2004

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LP150E06

Wire Yellow LGC /Core LGC, Wire Pink Sumitomo/ Core Sumitomo

Connector Small, Shrinkage Tube

NO	ITEM NAME
1	SHIRINKAGE TUBE/LG70
2	WIRE WHITE SMALL/LG
3	COBALT SMALL/LG
4	BLACK SMALL/LG
5	YELLOW SMALL/LG
6	CORE/LG
7	YELLOW WHITE SMALL/SUMITOMO
8	WHITE SMALL/SUMITOMO
9	PINK SMALL/SUMITOMO
10	BLUE BIG/SUMITOMO
11	GRAY BIG/SUMITOMO
12	PINK BIG/SUMITOMO
13	WHITE BIG/SUMITOMO
14	CORE/SUMITOMO
15	PINK BIG/NISSEI
16	WHITE BIG/NISSEI
17	CORE/NISSEI
18	CONNECTOR BIG
19	CONNECTOR SMALL
20	PINK BIG/KURABE
21	BLUE BIG/NISSEI
22	BLUE BIG/KURABE
23	BLACK SMALL/SUMITOMO
24	COBALT SMALL/SUMITOMO
25	GRAY BIG/KURABE
26	WHITE BIG/KURABE
27	GREEN SMALL/LGC
28	YELLOW SMALL/SUMITOMO
29	SHRINKAGE TUBE

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SGS Testing Korea Co., Ltd.

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Test Report No. F690101/LF-CTS038000 Date : December 10, 2004 Page 3 of 11

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results			
				(1)	(2)	(3)	(4)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	n. d.	16	n. d.	13
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results			
				(5)	(6)	(7)	(8)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	50	55	49	33
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results			
				(9)	(10)	(11)	(12)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	57	n. d.	n. d.	n. d.
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results			
				(13)	(14)	(15)	(16)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	53	15	n. d.	n. d.
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Omsan-up, Ulsu-gun, Ulsan, Korea 689-890
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet-http://www.sgslab.co.kr

Test Report No. F690101/LF-CTS03B000 Date : December 10, 2004 Page 4 of 11

Heavy Metal Test

Items	Unit	Test Method	D.L.	Results			
				(17)	(18)	(19)	(20)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	12	n. d.	n. d.	n. d.
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results			
				(21)	(22)	(23)	(24)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	n. d.	n. d.	46	33
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results		
				(25)	(26)	(27)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	n. d.	n. d.	14
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.	n. d.

Items	Unit	Test Method	D.L.	Results	
				(28)	(29)
Cadmium (Cd)	mg/kg	USEPA 3062, ICP-AES	1	n. d.	n. d.
Lead (Pb)	mg/kg	USEPA 3062, ICP-AES	10	n. d.	n. d.
Mercury (Hg)	mg/kg	USEPA 3062, ICP-AES	2	n. d.	n. d.
Hexavalent Chromium (Cr VI)	mg/kg	USEPA 3060A, UV-Vis	0.16	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L. = Detection Limit

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-rd, Omsan-up, Ulsan-gun, Ulsan, Korea 680-890
Tel : 052)239-6008~10, Fax: 052)239-6913, Internet: <http://www.sgs-lab.co.kr>

Test Report No. F690101LF-CTS038000 Date : December 10, 2004 Page 5 of 11

Flame Retardants

Items	Unit	Test Method	D.L.	Results			
				(1)	(2)	(3)	(4)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Onsan-up, Ulsu-gun, Ulsan, Korea 689-890
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Test Report No. F690101/LF-CTS038000 Date : December 10, 2004 Page 6 of 11

Flame Retardants

Items	Unit	Test Method	D.L.	Results			
				(5)	(7)	(8)	(9)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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SGS Testing Korea Co., Ltd.

#1002-2, Hwasan-ri, Daejeon-bu, Ulsan-gun, Ulsan, Korea 689-890
Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet: <http://www.sgs-lab.co.kr>

Test Report No. F690101/LF-CTS038000 Date : December 10, 2004 Page 7 of 11

Flame Retardants

Items	Unit	Test Method	D.L.	Results			
				(10)	(11)	(12)	(13)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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SGS Testing Korea Co., Ltd.

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Tel : 052)239-6908~10, Fax: 052)239-6913, InterNet: http://www.sgslab.co.kr

Test Report No. F690101/LF-CTS038000 Date : December 10, 2004 Page 8 of 11

Flame Retardants

Items	Unit	Test Method	D.L.	Results			
				(15)	(16)	(18)	(19)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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Flame Retardants

Items	Unit	Test Method	D.L.	Results			
				(20)	(21)	(22)	(23)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromobiphenyl	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n. d.	n. d.	n. d.	n. d.
Dibromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tribromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Tetrabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Pentabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Hexabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Heptabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Octabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Nonabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.
Decabromodiphenyl ether	mg/kg		5	n. d.	n. d.	n. d.	n. d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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Flame Retardants

Items	Unit	Test Method	D.L.	Results		
				(24)	(25)	(26)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n.d.	n.d.	n.d.
Dibromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Tribromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Tetrabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Pentabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Hexabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Heptabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Octabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Decabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n.d.	n.d.	n.d.
Dibromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Tribromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Tetrabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Pentabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Hexabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Heptabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Octabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Nonabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Decabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

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Flame Retardants

Items	Unit	Test Method	D.L.	Results		
				(27)	(28)	(29)
Polybrominated Biphenyls (PBBs)	-	-	-	-	-	-
Bromobiphenyl	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n.d.	n.d.	n.d.
Dibromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Tribromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Tetrabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Pentabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Hexabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Heptabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Octabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Decabromobiphenyl	mg/kg		5	n.d.	n.d.	n.d.
Polybrominated Diphenyl Ethers (PBDEs)	-	-	-	-	-	-
Bromodiphenyl ether	mg/kg	With reference to 83/264/EEC and 2003/11/EEC. Analysis was performed by GC/MS.	5	n.d.	n.d.	n.d.
Dibromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Tribromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Tetrabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Pentabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Hexabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Heptabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Octabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Nonabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.
Decabromodiphenyl ether	mg/kg		5	n.d.	n.d.	n.d.

Note (1) n. d. = Not detected
(2) D. L = Detection Limit

End

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